SCIENCE NEWS

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KRYPTON CHLORIDE

KRYPTON, one of the rare gases that form a small percentage of the air, has been forced into its first known chemical union by three physicists of the Chemical Institute at Bonn—Drs. A. von Antropoff, K. Weil and H. Frauenhof. This is rated as a scientific triumph, for the rare gases are all exceedingly inert chemically, and under ordinary circumstances do not unite with other elements at all. Only one of them, helium, now well known because of its use in airships, has been driven into chemical activity by several English physicists.

The Bonn experimenters produced what seems to be krypton chloride by a combination of low pressure, low temperature and electric discharge. They circulated krypton gas by means of a pump, keeping the pressure at approximately one to five per cent. of ordinary atmospheric pressure, and maintaining a low temperature with liquid air. As the gas was circulated through a glass tube it was subjected to an electric discharge, and at the same time chlorine gas was introduced.

The pressure within the tube fell, indicating a decrease in the number of the gas molecules present, and therefore the probable combination of the two elements to form a compound with a smaller number of larger molecules. At the same time a dark-red substance appeared, which the investigators take to be the krypton chloride compound.

A similar fall in pressure was recorded when bromine was used instead of its chemical relative chlorine, indicating the possibility of the formation of a second compound, krypton bromide.

"Control" experiments, in which one or the other of the conditions of the main experiment was omitted, or in which argon, another rare gas, was substituted for the krypton, yielded only negative results.

Their preliminary results have been reported by the German scientific periodical *Die Naturwissenschaften*. The researches are being continued and a detailed account will be published in the near future.

LIFE EXPECTATION OF MACHINERY

AFTER more than fifteen years of research, investigators connected with the Iowa Engineering Experiment Station have succeeded in establishing mathematical laws describing the mortality data for many kinds of physical property, according to Professor Edwin B. Kurtz, head of the department of electrical engineering at the University of Iowa, and Robley Winfrey, editor on the experiment station staff. Assisted by Professor G. W. Snedecor and Professor A. E. Brandt, of the department of mathematics at the Iowa State College, these men have announced results of research on life characteristics of physical property which will permit engineering valuations and depreciation allowances for many kinds of industrial equipment to be made with accuracy hitherto unattainable.

Just as life insurance actuaries make mass studies of human mortality records, so mass studies of the service lives of such physical equipment as passenger automobiles, waterworks pumps, incandescent lamps, crossties, disc harrows and freight cars can be made.

Among the records studied by Professor Kurtz are data extracted from public utility valuation reports, publications of such organizations as the American Waterworks Association, the Illuminating Engineers' Society and the Forest Products Laboratories, and reports of the North German and Prussian telegraph systems as far back as 1852.

Mathematical equations descriptive of thirteen type mortality curves have been obtained for sixty-five separate property groups in such industries as water supply, telephone and telegraph, electric service, steam and electric railways, motor vehicles and agricultural implements.

These mortality studies are not restricted to "death" rates alone in the service lives of the equipment units involved. Professors Snedecor and Brandt have made use of sets of curves and equations due to the English biometrician, Professor Karl Pearson, enabling them to compute extensive tables which serve to answer questions relating to the average life of industrial units. Such tables could be employed in the determination of proper premium rates for "life" insurance policies on the effective working lives of industrial equipment of all kinds, under methods altogether comparable to those used by human-life insurance companies. The equations, graphs and tables will give cost accountants more accurate estimates of depreciation than have previously been possible. The considerable amount added to knowledge of mass probabilities will permit replacement schedules for many industrial organizations to be prepared with greater exactness and resulting economy. Professor Kurtz believes that these studies constitute only the beginning of far-reaching and comprehensive investigations which he looks forward to seeing greatly advanced.

STREPTOCOCCI GERMS

ALTHOUGH the germs known as haemolytic streptococci cause diseases as various as scarlet fever, erysipelas, pneumonia, heart disease, puerperal fever after childbirth, and sepsis after accident or surgical operation, and as secondary invaders, moreover, kill multitudes by giving a fatal end to temporary weakness, the identification of given streptococci with particular varieties of disease is very difficult.

Sir Frederick Andrewes, for many years until his death last February a member of the Medical Research Council, devoted the last working years of his life to promoting advance in this direction, hoping by using the most refined methods of analysis to improve the classification of the streptococci. The Medical Research Council has just issued the report of the work carried on during more than seven years by him and his collaborators, Miss Lettice Digby and Mrs. Ethel M. Christie, which concludes with the statement that "the more one studies Haemo-

lytic streptococci the more strongly is the impression gained that they are in a state of constant flux in which it is difficult to find any firm foundation for a permanent systematic classification.''

It seems that these particular bacteria have such inherent powers of adaptation to their chemical environment that the very methods used for discrimination between forms of different origin may themselves bring change to the characters of the organisms under observation. The worker may find himself at first identifying an apparently distinctive type of streptococcus as being associated with a certain form of disease, and later discover by more critical work that it was his own methods that produced the type characters on which he first depended.

The serious and many-sided danger of the haemolytic streptococcus to human life seems to arise from the very instability of its physico-chemical behavior, for the organism as an invading parasite seems to have special facility in adapting the refinements of its living chemistry to the particular host environment in which it finds itself. Studies of different ''types'' in terms of formal definition become fruitless or meaningless, the Medical Research Council points out, if each type is a passing chemical phase quickly assumed and readily abandoned. Progress would seem to lie in gaining deeper knowledge of the exact chemical events involved in the interplay of the parasitic organism and the environment of the invaded host.

CAUSE OF THE INCREASE IN CANCER DEATHS

THE increase in cancer is real and is due to two factors. In the first place, more people are escaping the hazards of youthful diseases and are living to the age at which cancer attacks. Second, and even more important, more of these people who live to the so-called cancer age are being saved from dying of other diseases, such as pneumonia, which formerly took a large toll at the cancer age.

These conclusions, based on a study of Canadian vital statistics, were reached by Dr. Madge Thurlow Macklin, of the University of Western Ontario Medical School. They were made public in *The American Journal of Cancer*.

Dr. Macklin compared death rates from cancer and from all causes in Canada at various age levels since 1901. She found that as public health measures decreased the prevalence of preventable diseases, like smallpox, yellow fever, malaria, diphtheria and tuberculosis, the age of the population changed. More people now live to be over forty years than did in 1901. At the same time the cancer deaths increased, not only in the general population but in the older age groups.

Dr. Macklin is of the opinion that the cancer rate might justifiably be used as an index of the state of preventive medicine and sanitation in a country. Those with good public health organizations have a high cancer rate; those with a low cancer rate show poor public health facilities. Not only does preventive medicine bring more people to the cancer age, but it keeps them from dying of preventable causes after they get there, so that it is inevitable that the death rate from some few diseases, not preventable at present, will mount.

That Dr. Macklin is not unduly discouraged by her findings is evident from a concluding sentence, the philosophy of which should prevent people in general from taking a too gloomy view of the situation. ''We must all die of something,'' she pointed out, ''and it is inevitable, as we eliminate one cause of death after another, that we increase the death rate from the causes that remain, for while we may increase the length of life, we do not decrease the certainty of death.''

While Dr. Macklin's conclusions are based on Canadian statistics, she believes that a similar analysis of the statistics of other countries would lead to the same conclusions.

THE PREVENTION OF PSITTACOSIS

DON'T make friends with any parrots, love birds or parakeets from California unless they have a certificate from a health officer declaring them free from parrot fever. This warning has been issued by Surgeon-General Hugh S. Cumming, of the U. S. Public Health Service. It is intended to protect people from psittacosis, or parrot fever. If they fail to heed the warning, they run a good chance of getting this serious, often fatal disease.

Some of the breeding aviaries of Southern California, where birds of the parrot family are raised, are infected with psittacosis, an officer of the U. S. Public Health Service found in a study undertaken at the invitation of the California State Department of Public Health. Birds from these aviaries may be apt to give the disease to unsuspecting bird owners and friends.

So to protect the health of people all over the country the surgeon-general has issued his warning. But he has done more than warn. Upon his advice, Secretary of the Treasury Mills has now limited the interstate transportation of birds of the parrot family by common carriers to those birds certified by the proper health authority of the state as coming from aviaries free from infection. Bootlegging of the birds is expected, however, so Surgeon-General Cumming warns against buying or handling any strange bird.

Out in Southern California, and particularly in Los Angeles, these birds are often raised in private families by ladies wishing to make pin money. Many of the birds are peddled from house to house in flivvers. One case of psittacosis in Oregon was traced to a California love bird sold in this way.

The restrictions on importation of parrots and related birds from outside the United States remain in force. These were put into effect shortly after the serious outbreak of parrot fever in 1929–1930. Many of these cases were traced to parrots and love birds imported from South America. Under present regulations, an individual returning from abroad may bring in no more than five such birds, but commercial shipments of birds must be held fifteen days at U. S. quarantine stations for

observation. Provision for the condition in which the birds are kept during the voyage, relating to space, air, sanitation, etc., also is made in the import regulations.

AUTUMN LEAF COLORS

GORGEOUS autumnal colors in woods and along roadsides are due to two general classes of chemical compounds in the aging leaves: carotinoids and anthocyanins. The carotinoids are responsible for the yellows and the anthocyanins for the reds and purples.

Dr. Charles E. Sando, of the U. S. Department of Agriculture, has summarized the process by which leaves turn from green to gay, when promises of frost begin to cool the air. Carotinoid pigments are present in all leaves, but are masked most of the time by the more abundant green coloring matter, chlorophyl. Chlorophyl is always being both formed and destroyed in leaves, but in autumn destruction goes on faster than formation, finally reducing it to a low point which permits the yellow carotinoids to be seen. If no other masking pigment is present, such leaves become pure yellow or orange, like tulip-tree, willow and sassafras.

The other class of pigments, the anthocyanins, are dissolved in the cell sap. With the exception of a few purple-leaved or bronze-leaved plants, these pigments are also concealed by the more abundant chlorophyl, and show themselves only when it has been sufficiently broken down. At the same time, certain changes in the carbohydrate content of the leaves may cause an actual increase in the amount of the anthocyanins present. Thus we get the strong reds and purples of sumac, blackberry, sweet-gum, oaks, etc.

Trees like maples, which sometimes show a gorgeous mottling of yellows and reds, may have local patches of anthocyanins masking the carotinoid ground-color.

ITEMS

THE earthquake that worked ruin in various Greek towns on September 26 originated under the Aegean Sea a little distance off the coast, according to calculations made by the U. S. Coast and Geodetic Survey, based on data received by Science Service from a number of seismological observatories. The approximate location of the epicenter was in latitude 39.5 degrees north, longitude 24 degrees east, and the time of origin was 2: 20.6 P. M., eastern standard time. All instrumental records, according to the Coast and Geodetic Survey, indicated an earthquake of terrific violence.

BROOKS'S comet, a periodic visitor to the vicinity of the sun, last seen in 1925, was sighted by Professor George Van Biesbroeck, of the Yerkes Observatory, the astronomical clearing house at Harvard College Observatory has been notified by telegraph. It has reappeared in the heavens very close to the place that has been predicted for it from its past history. On September 25, the comet was in the constellation of Pisces, which is in the southeastern evening sky. With a magnitude of 12, it is too faint to be seen without a fair sized telescope and its past history indicates that it will not become visible to the unaided eye.

HEALTH officials are not alarmed over the infantile paralysis situation this season. While Philadelphia and adjacent territory has suffered a sharp outbreak, there has been only the expected seasonal increase in the rest of the country. More than half the cases reported to the U. S. Public Health Service for the entire country for the week of September 24 were from Pennsylvania, which reported 156 cases. Of these, 65 were reported from Philadelphia. The total reported for the United States was 293. Last week's total was 286 for the country, 145 for Pennsylvania and 112 from Philadelphia. These figures indicate that the outbreak in that locality is on the wane. In neighboring New Jersey there has been a slight increase from 40 cases for the week of September 17 to 51 for the week of the 24th. This was the only state besides Pennsylvania reporting a large number of cases of the disease.

X-RAY photographs of insects, believed to be the first ever made, have been taken at the Biological Laboratory at Cold Spring Harbor, New York, by Dr. Hugo Fricke and Irwin Sizer. They were made with a specially constructed x-ray tube, using small plates such as dentists use. The pictures show many scientifically interesting details of the internal structure of insects, and it is believed that this new method can be used to advantage by students of insect life.

CANCER may be linked with permanent changes in cell centrosomes rather than with abnormal behavior of chromosomes, in the opinion of Mrs. Margaret Reed Lewis and Dr. Warren H. Lewis, of the Carnegie Institution of Washington and the Johns Hopkins Medical School. The studies on which this opinion is based were made with the aid of a special moving picture camera devised by Dr. Lewis, and are made public in the current issue of the *American Journal of Cancer*. Investigators have held for some time that the difference between cancer cells and normal cells lay in the abnormal multiplication of the cancer cells. By studying moving pictures of the actual process of cell multiplication, in both normal and cancer cells, it is hoped to throw light on this phase of the problem.

THE Freudian theory that all children tend to prefer the parent of the opposite sex failed of confirmation in a study conducted by Dr. John E. Anderson, of the University of Minnesota, reported to the Southern Society for Philosophy and Psychology and published in *The Psychological Bulletin*. Dr. Anderson sent questionnaires to the parents of 3,178 children, of whom 1,626 were boys. They revealed that there are no outstanding sex differences at any age level in attachment for parents. About half of both girls and boys have no favorites in the household. Of the others, there is a slight tendency for both boys and girls to prefer the mother; this tendency decreases with age. Jealousy is displayed more often when the mother shows affection to another child than under any other circumstances. Jealousy decreases with age and is somewhat more likely to be present in girls than in boys.